U.S.-Mexico Transboundary Aquifer Assessment Program (TAAP)

Developing knowledge and tools needed to inform joint management of binational aquifers

UNESCO-IHP Fall Meeting
November 16, 2016

James Leenhouts (presenting), James Callegary, Delbert Humberson, Anne Marie Matherne, Robert Joseph, John Bumgarner, Sharon Megdal, San Fernald, John Tracy

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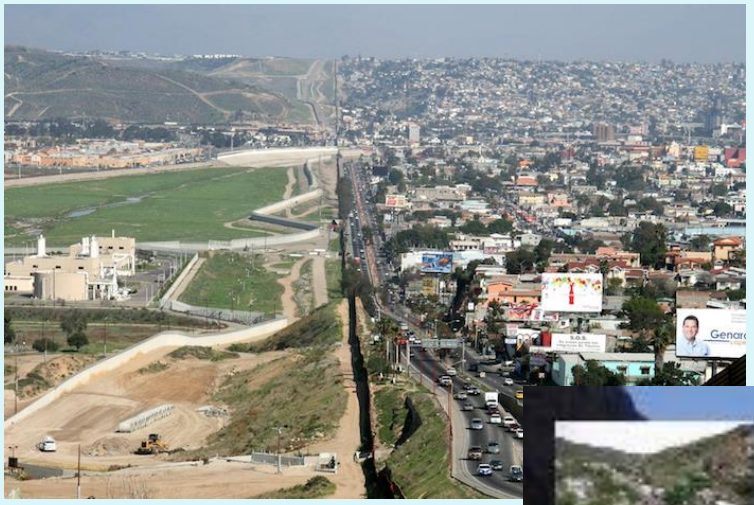
WASHINGTON
PACIFIC NORTHWEST
11.2
276.2
OREGON
IDAHO
MONTANA
SOURIS-RED-RAINY
0.5
6.5
NORTH DAKOTA
MISSOURI
17.5
62.9
SOUTH DAKOTA
WYOMING
NEBRASKA
GREAT BASIN
3.5
10.0
NEVADA
UTAH
UPPER COLORADO
4.2
13.9
COLORADO
KANSAS
CALIFORNIA
25.8
74.6
CALIFORNIA
ARKANSAS-WHITE-RED
9.6
68.7
ARIZONA
NEW MEXICO
OKLAHOMA
LOWER COLORADO
10.6
10.3
RIO GRANDE
3.8
5.4
1
UNITED
2
STATES
MEXICO
3
4
5
6
7
PACIFIC OCEAN
BAJA CALIFORNIA
Gulf of California
SONORA
CHIHUAHUA
COAHUILA
TEXAS
TEXAS GULF
9.1
33.1
Gulf of Mexico

U.S. – Mexico: Shared Aquifers, Shared Issues



Population growth

Maquiladoras

Mining impacts

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U.S.-Mexico Transboundary Aquifer Assessment Act

U.S. Public Law 109-448 (Dec. 22, 2006)

- Broad Objectives
  - Integrated scientific approach to assess priority transboundary aquifers
  - Produce scientific products…that are capable of being broadly distributed and provide scientific information needed by water managers and natural resource agencies on both sides of the border
- 10 year, $50 million authorization, with US Geological Survey as the lead agency (Dept. of the Interior)
- Lead non-federal collaborators are university-based water centers; Participating US states: Arizona, New Mexico and Texas; MX States: Sonora and Chihuahua

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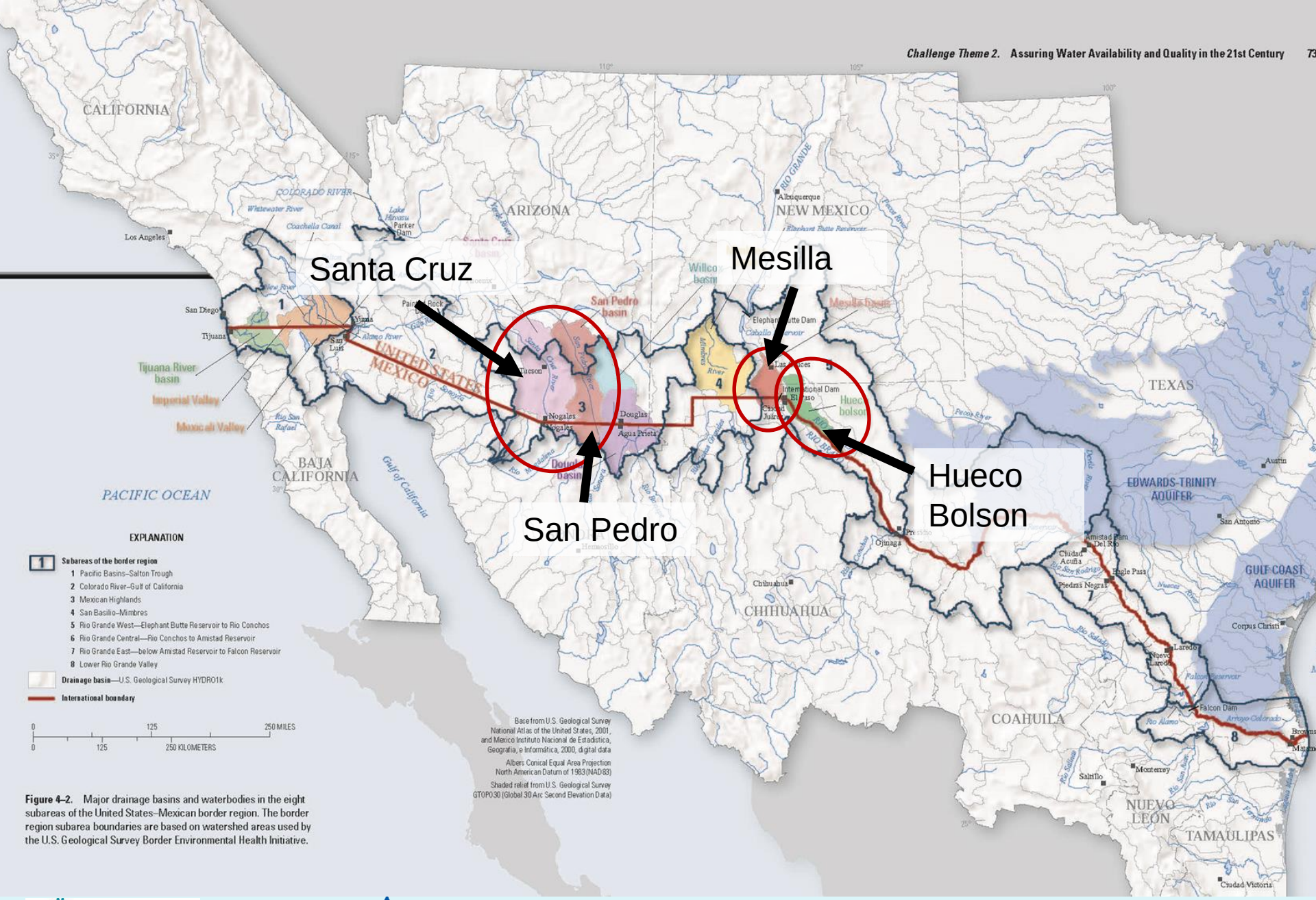

Figure 4–2. Major drainage basins and waterbodies in the eight subareas of the United States–Mexican border region. The border region subarea boundaries are based on watershed areas used by the U.S. Geological Survey Border Environmental Health Initiative.

Objectives (summarized from TAAP Act)

- Evaluate all available data and publications (for developing workplans)
- Create new or enhance existing GIS database to characterize the spatial and temporal aspects of each aquifer
- Use field studies to develop additional data needed to define aquifer characteristics
- Develop scientifically sound GW-flow models to assist with water management including SW/GW interactions
- Release products that provide scientific information needed by water managers and agencies on both sides of the border

Links to IHP Eighth Phase: Water Security

- Understanding coupled human and natural processes
- Groundwater in a changing environment
- Promoting management of transboundary aquifers
  - Filling data gaps
  - Establish GIS databases
  - Develop shared data and tools
- Enhancing shared knowledge and communication
- Addressing water scarcity and quality

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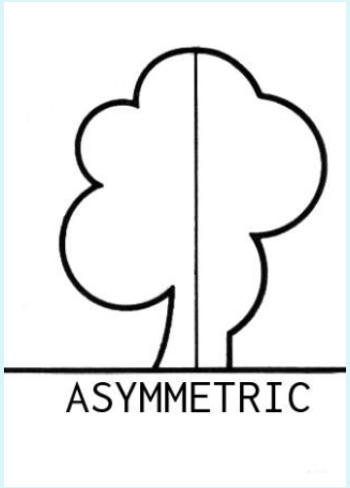
Importance of Building Relationships

Binational partnerships require:

- Mapping between asymmetric institutions
- Appreciation of cultural differences
- Trust and Respect
- Listening
- Time



Signing of the "Joint Report of the Principal Engineers Regarding the Joint Cooperative Process United States-Mexico for the Transboundary Aquifer Assessment Program", August 19, 2009

INTERNATIONAL BOUNDARY AND WATER COMMISSION
UNITED STATES AND MEXICO

El Paso, Texas
August 19, 2009

JOINT REPORT OF THE PRINCIPAL ENGINEERS REGARDING THE JOINT COOPERATIVE PROCESS UNITED STATES-MEXICO FOR THE TRANSBOUNDARY AQUIFER ASSESSMENT PROGRAM

To the Honorable Commissioners,
International Boundary and Water Commission,
United States and Mexico,
El Paso, Texas and Ciudad Juarez, Chihuahua.

Sirs:

We respectfully submit for your consideration this Joint Report recommending the joint cooperative process between the United States and Mexico to implement an assessment program for the transboundary aquifers shared by both countries.

I. Background

Since the decade of the 1970s, there exists within the framework of the International Boundary and Water Commission (IBWC), a process for the exchange of information on groundwater along the border between the United States and Mexico. Any issues of data or studies have been addressed on a case by case basis through mutual consultation as established in Resolution 6 of IBWC Minute No. 242.

By way of example, on December 2, 1997, the IBWC issued the "Joint Report of Principal Engineers Regarding Information Exchange and Mathematical Modeling in the El Paso, Texas and Ciudad Juarez, Chihuahua Area Aquifer." The IBWC arranged for the exchange of groundwater data between both countries and the development of a bilingual publication that was produced jointly under this effort.

On December 22, 2006, United States Public Law 109-448, the "United States-Mexico Transboundary Aquifer Assessment Act" was passed, establishing a program to evaluate transboundary aquifers between the United States and Mexico, which included the possibility of applying United States funds for assessment activities in Mexico.

II. International Boundary and Water Commission's Position and Process Framework

The IBWC, United States and Mexican Sections, are aware of the interest on both sides of the border to preserve and understand the aquifers used by both countries, whereby it is considered necessary to develop a team of binational experts to assess transboundary aquifers, exchange data, and if needed, develop new datasets.

Initiatives that include transboundary water resources are traditionally coordinated through the IBWC using the customary binational cooperation process used by both

RECOMMENDATION

That the activities for the joint cooperative process related to the transboundary aquifer assessment program be adopted by the International Boundary and Water Commission in accordance with the terms described in the present Joint Report.

Respectfully,

John Merino
Principal Engineer
United States Section

Luis Antonio Rascón Mendoza
Principal Engineer
Mexican Section

COMISIÓN INTERNACIONAL DE LÍMITES Y AGUAS
ENTRE MEXICO Y LOS ESTADOS UNIDOS.

El Paso, Texas, 19 de agosto de 2009

INFORME COMÚN DE LOS INGENIEROS PRINCIPALES REFERENTE AL PROCESO DE COOPERACIÓN CONJUNTA MÉXICO – ESTADOS UNIDOS PARA EL PROGRAMA DE EVALUACIÓN DE ACUÍFEROS TRANSFRONTERIZOS

A los Honorables Comisionados,
Comisión Internacional de Límites y Aguas entre
México y los Estados Unidos,
Ciudad Juárez, Chihuahua y El Paso, Texas.

Señores:

Respetuosamente sometemos a su consideración este Informe Común recomendando el proceso de cooperación conjunta entre México y Estados Unidos para la realización de un programa de evaluación de los acuíferos transfronterizos entre ambos países.

I. Antecedentes

Desde la década de los 1970's ha tenido lugar en el seno de la Comisión Internacional de Límites y Aguas (CILA) un proceso de intercambio de información sobre aguas subterráneas en diferentes zonas de la frontera entre México y Estados Unidos. Cualquier asunto de información o estudios sobre esta materia se ha atendido caso por caso sobre la base de la consulta recíproca establecida en la Resolución 6 del Acta 242 de la CILA.

Como ejemplo, el 2 de diciembre de 1997, la CILA emitió un "*Informe Común de los Ingenieros Principales relativo al Intercambio de Información y Modelo Matemático del acuífero en la zona de Ciudad Juárez, Chihuahua – El Paso, Texas*", en el marco del cual, la CILA coordinó el intercambio de información de datos de aguas subterráneas entre los dos países, así como la elaboración y publicación bilingüe del documento conjunto generado como resultado de dicho informe.

El 22 de diciembre de 2006, se aprobó la Ley Pública de Estados Unidos 109-448, relativa al "Acta sobre Evaluación de Acuíferos Transfronterizos México-Estados Unidos", estableciendo un Programa de Evaluación de Acuíferos Transfronterizos entre México y Estados Unidos, el cual incluye la posibilidad de aplicar recursos estadounidenses para actividades de evaluación en México.

II. Marco de la Posición y Proceso de la Comisión Internacional de Límites y Aguas

Las Secciones mexicana y estadounidense de la CILA, están conscientes del interés en ambos lados de la frontera en entender y preservar los acuíferos compartidos por ambos países, para lo cual se considera necesario establecer un grupo de expertos binacionales para evaluar los acuíferos transfronterizos, intercambiar información y según se requiera, desarrollar nuevas series de datos.

Las iniciativas que incluyen recursos de aguas transfronterizas, tradicionalmente son coordinadas a través de la CILA aplicando el proceso acostumbrado de cooperación

RECOMENDACIÓN

Que las actividades para el proceso de cooperación conjunta respecto al programa de evaluación de acuíferos transfronterizos, sean adoptadas por la Comisión Internacional de Límites y Aguas en los términos descritos en el presente Informe Conjunto.

Respetuosamente

Luis Antonio Rascón Mendoza
Ingeniero Principal
Sección mexicana

John Merino
Ingeniero Principal
Sección estadounidense

Joint Cooperative Framework

- The objective of the joint cooperative process for groundwater research is to improve the knowledge base of transboundary aquifers.
- The following will be carried out within the IBWC framework:
  - Assure concurrence of the US and MX for binational aquifer assessment activities
  - Facilitate agreement on the aquifers that will be evaluated jointly
  - Establish and coordinate binational technical advisory committees for each aquifer

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Joint Cooperative Framework (continued)

- Serve as an official repository for binational studies developed
- Each country will be responsible for any costs of projects conducted in its territory, in addition to selecting the participants and consultants to carry out the studies in that country. Either country may contribute to costs for work done in the other country. This contribution shall be distributed according to the process agreed upon through the IBWC.

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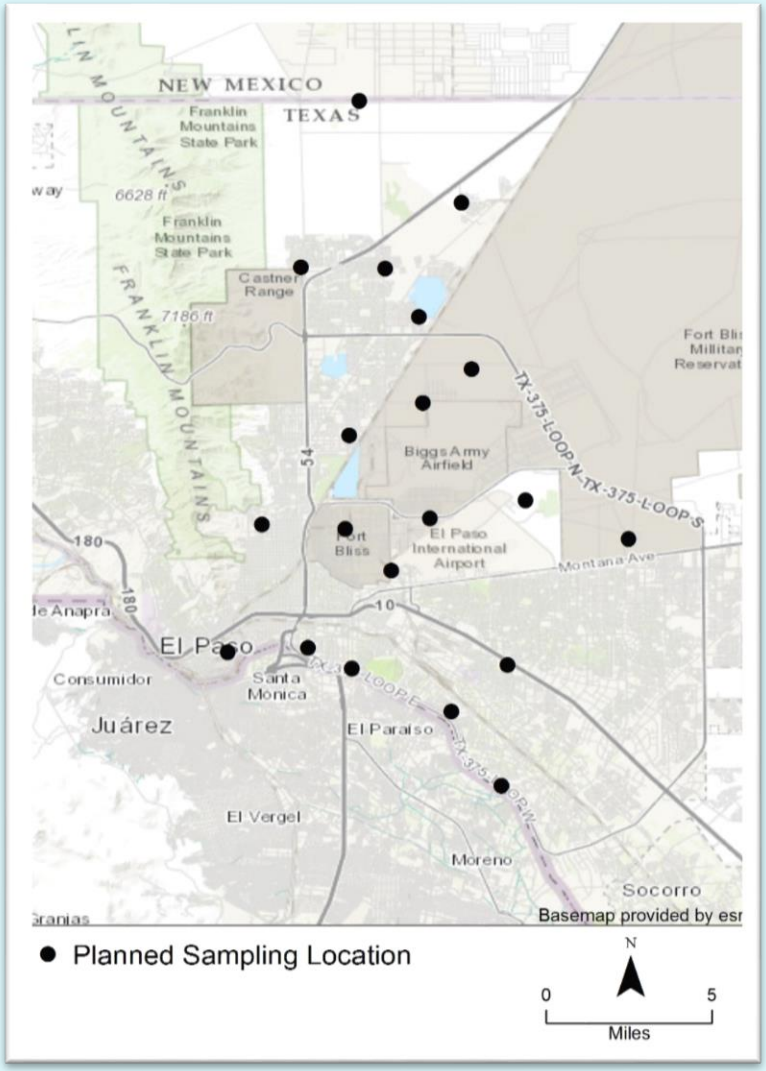
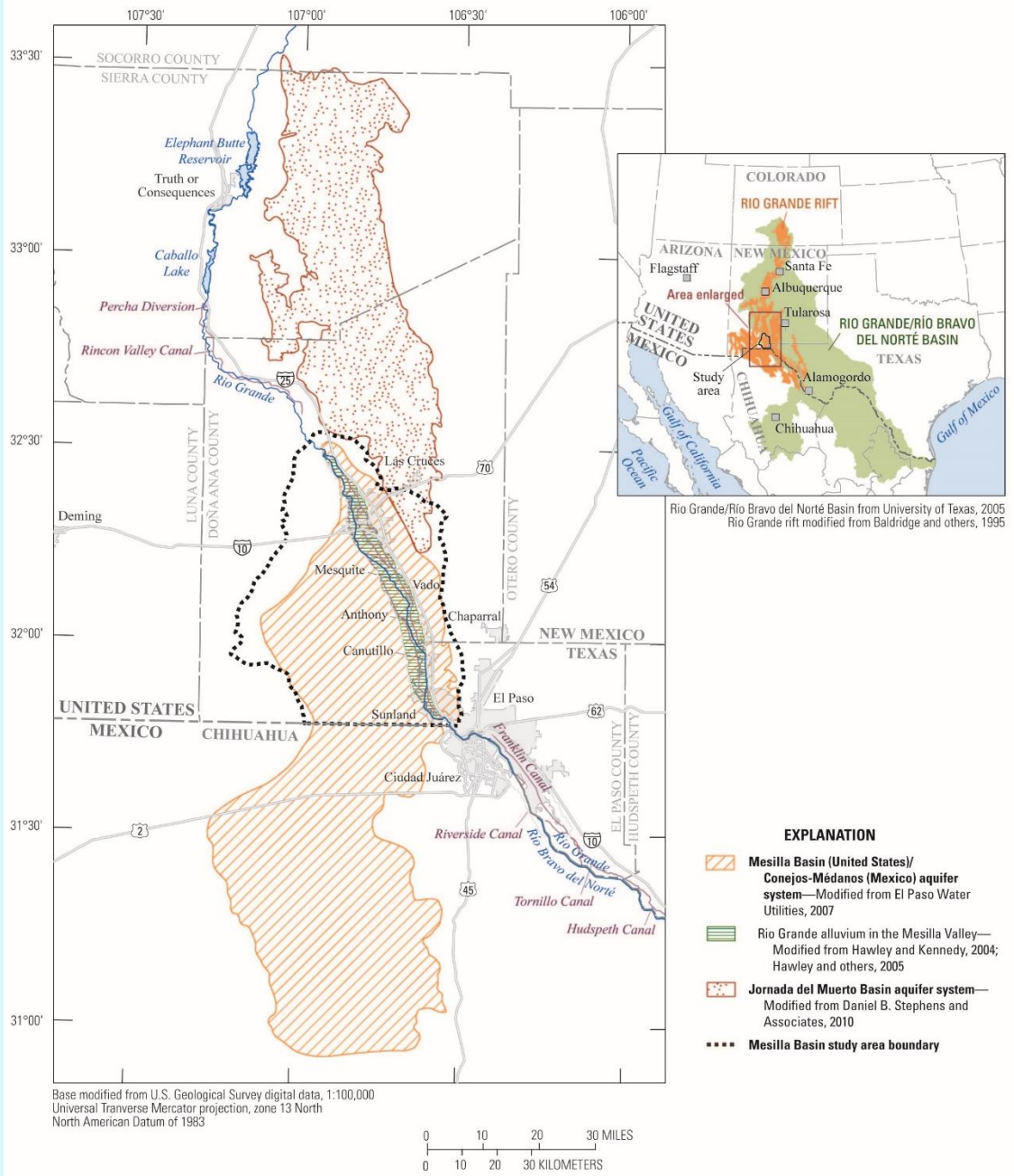
Hueco Bolson Sampling

- Planned Sampling of 20 wells that are geographically distributed across a wide area.
- Samples will be analyzed to determine baseline chemistry.
- Characterizing geochemistry can improve our understanding of the aquifer (e.g. source and movement of groundwater).



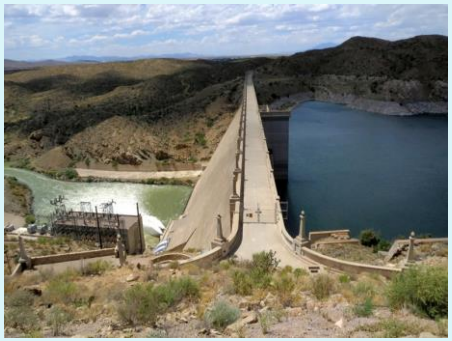
Products and Progress – Mesilla Basin/Conejos-Médanos

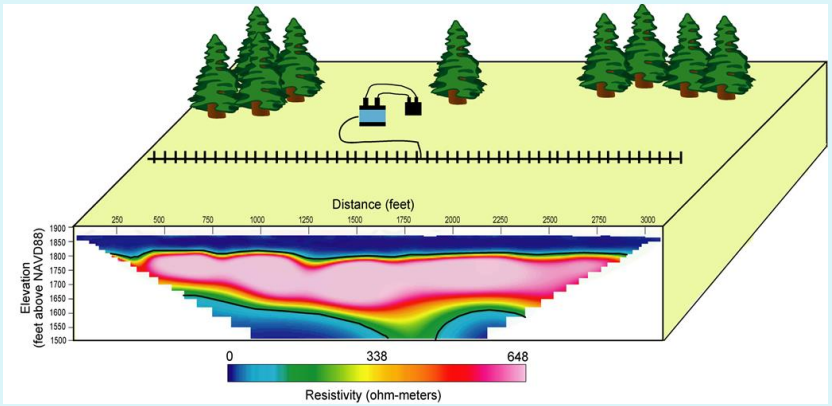
- Joint binational work plan
- Support work in Mexico
- Data compilation
- Improved hydrogeologic framework



Products and Progress – Mesilla Basin/Conejos-Médanos

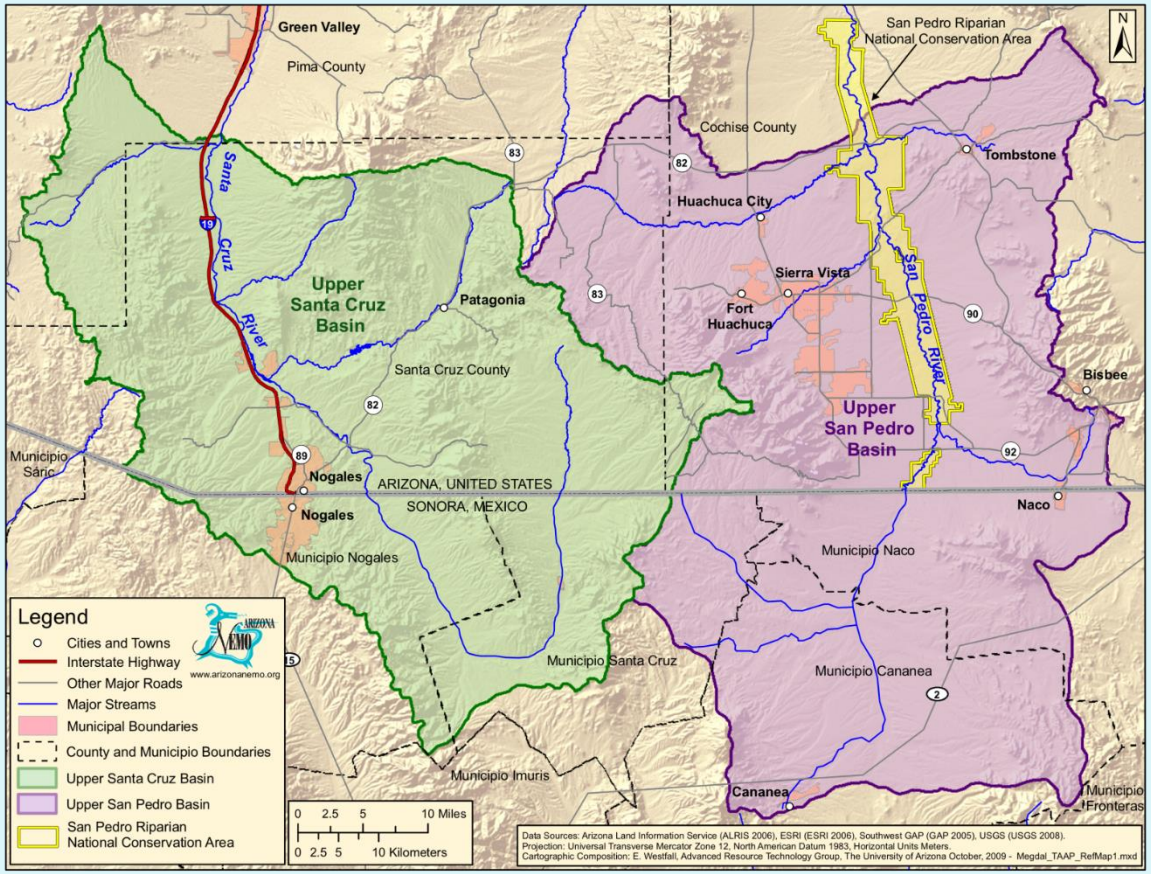
- Farm Process development for groundwater-flow model
- Assess hydraulic connection between Mesilla Basin and Hueco Bolson at Fillmore Pass
- Preliminary assessment of surface-water and groundwater interactions





Products and Progress – San Pedro and Santa Cruz Aquifers

Santa Cruz San Pedro



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San Pedro Binational Report

- Binational relationships!
- First of two reports – second for Santa Cruz
- Joint effort of USGS, WRRI, IBWC, Mexico
- Many data sets "harmonized"
- Bilingual – Spanish and English versions

CONAGUA

ARIZONA

USGS

SAN PEDRO RIVER AQUIFER BINATIONAL REPORT

January 31, 2016

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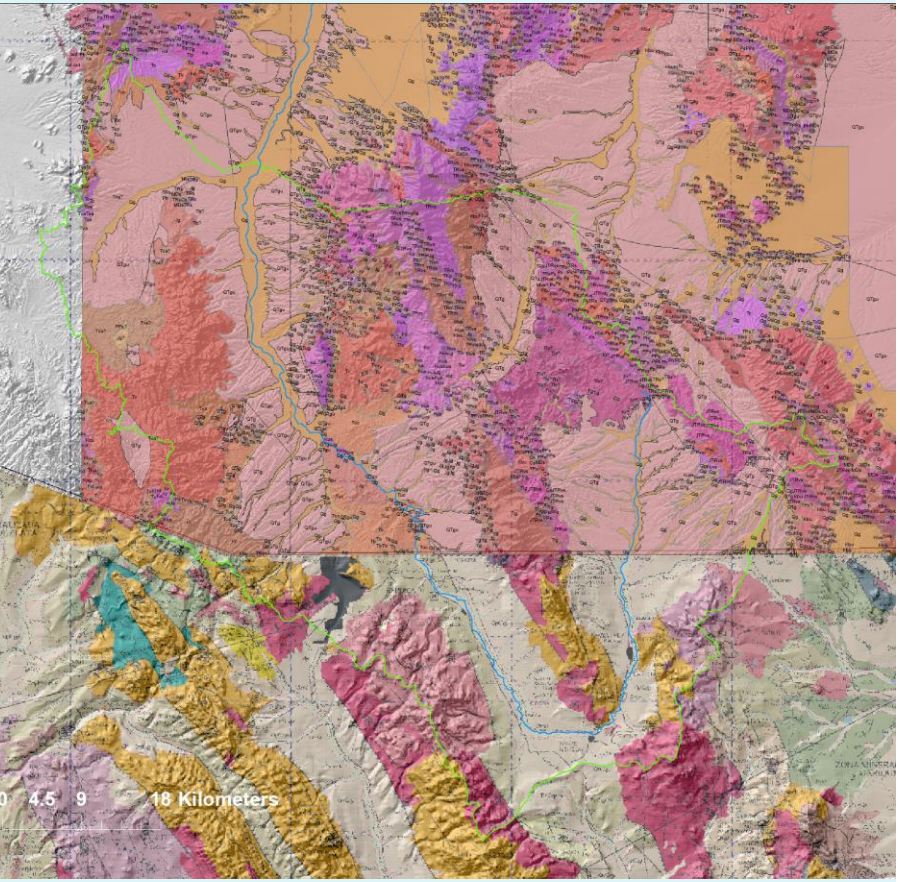
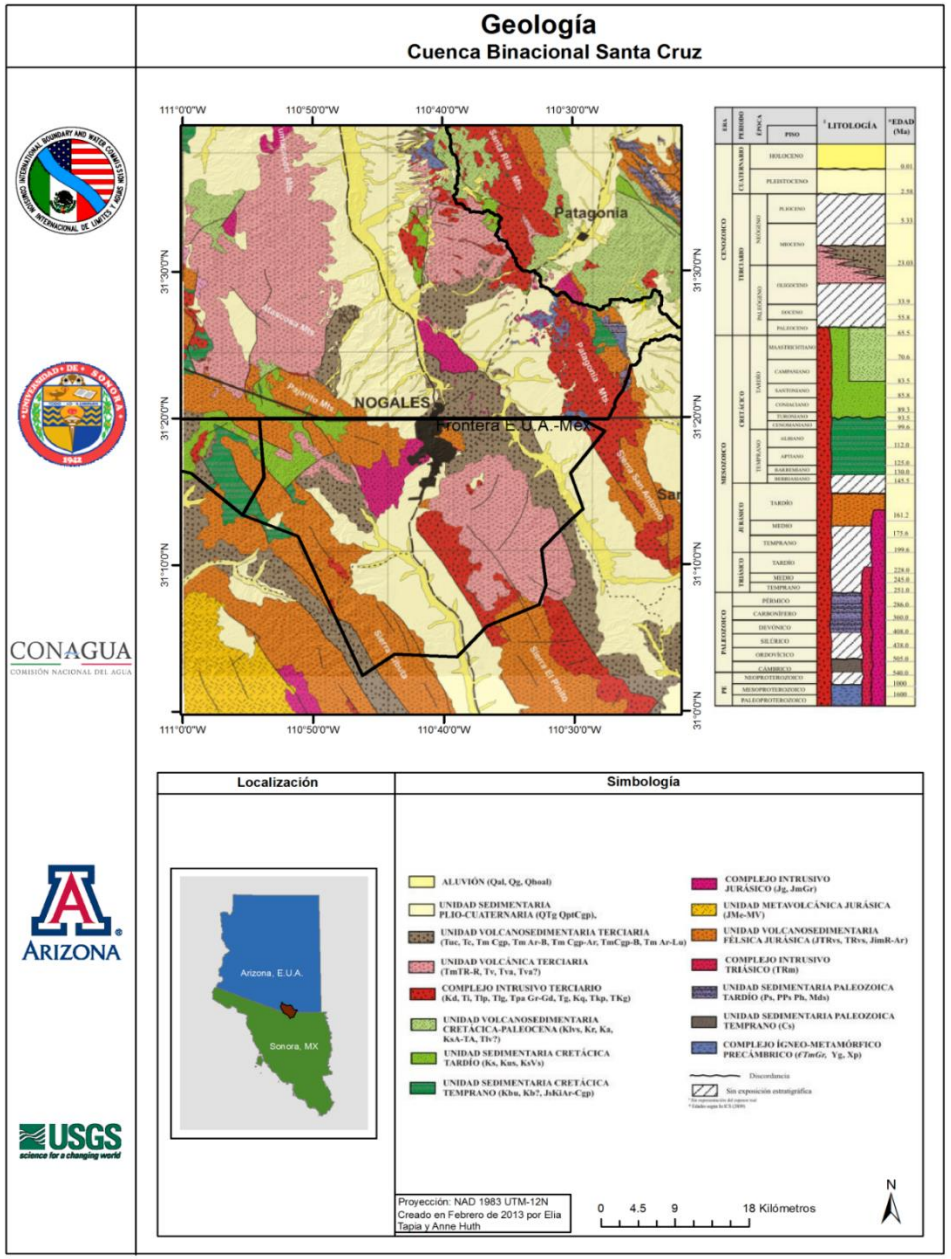
Example Data Set - Geology





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Program Plans and Future

- TAAP authorization has expired
  - Work to continue under the framework of the USGS Regional Groundwater Availability Studies
- Observe the purpose and priorities of TAAP while expanding the geographic scope to include additional transboundary aquifers
- Hold binational Groundwater Summit and establish joint technical committees

Questions?